UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,764	04/17/2007	Ramesh Varadaraj	P2003J083-WO	2493

27810 7590 01/26/2010

ExxonMobil Research & Engineering Company
P.O. Box 900
1545 Route 22 East
Annandale, NJ 08801-0900

EXAMINER	
SINGH, PREM C	
ART UNIT	PAPER NUMBER
1797	
MAIL DATE	DELIVERY MODE
01/26/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,764	VARADARAJ ET AL.	
	Examiner	Art Unit	
	PREM C. SINGH	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04/17/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 9 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Kovach et al (US Patent 4,405,445) ("Kovach").

3. With respect to claim 1, Kovach discloses a surfactant-enhanced atomization process (See abstract) comprising:

(a) mixing an effective amount of at least one surfactant with an atomization fluid to form a first mixture (See column 10, lines 18-32; column 14, lines 17-20);

(b) injecting the mixture into a fluidized catalytic cracking feed stream to form a second mixture (See column 14, lines 17-26); and

(c) conducting the second mixture through a feed nozzle (See column 10, lines 32-40).

4. With respect to claim 9, Kovach discloses:

(a) conducting the second mixture through a feed nozzle into a fluidized catalytic cracking reaction zone, thereby producing droplets of the second mixture and injecting them into a reaction zone (See column 10, lines 15-55, column 14, lines 17-28); and (b) contacting the droplets of the second mixture with a fluidized catalytic cracking catalyst under effective catalytic cracking conditions in the reaction zone thereby producing at least an FCC product stream comprising at least C_2- dry gas (See column 10, lines 15-55; column 14, lines 17-28, 59-68; column 15, lines 1-19).

Kovach further discloses stripping the spent catalyst to recover strippable hydrocarbons (See column 15, lines 26-37).

5. With respect to claim 14, Kovach discloses that the feed stream is selected from widely diverse materials as heavy bottoms from crude oil, heavy bitumen crude oil, those crude oils known as "heavy crude" which approximate the properties of reduced crude, shale oil, tar sand extract, products from coal liquification and solvated coal, atmospheric and vacuum reduced crude, aromatic extract from lube oil refining, tar bottoms, heavy cycle oil, slop oil, and refinery waste stream comprising mixtures of the foregoing. Such mixtures can for instance be prepared by mixing available hydrocarbon fractions, including oils, tars, pitches and the like (See column 5, lines 13-29). Kovach also discloses using heavy hydrocarbons boiling at about 1050oF (See column 5, lines 60-68).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2-8, 10-13 and 15-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kovach et al (US Patent 4,405,445) ("Kovach").

8. With respect to claims 2 and 3, Kovach discloses use of surfactant in an amount of 0.01 to 2 wt% (100 to 20, 000 ppm) (See column 10, lines 22-27). Thus, the range of amount of surfactant used by Kovach overlaps the claimed amount. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)*. Thus, it is expected that the amount of surfactant used by Kovach is also capable of reducing the static and dynamic interfacial tension between the fluidized catalytic cracking (FCC) feed stream and the atomizing fluid, similar to the Applicant's claim.

9. With respect to claims 4-6, Kovach discloses using anionic surfactants (See column 10, lines 22-32) similar to the claimed invention. Thus, it is expected that the surfactants used by Kovach should not decompose under FCC feed preheating, but should decompose under cracking conditions, as claimed by the Applicant, because both are using anionic surfactants. It is also expected that the hydrophilic lipophilic balance values should be in a range as claimed because Kovach is using surfactants similar to the Applicant's claim.

Although Kovach invention does not appear to specifically disclose alkyl alkoxylates, however, the invention does disclose use of anionic surfactants.

Since alkyl alkoxylates belong to the class of anionic surfactants, it would have been obvious to one skilled in the art at the time of invention to use any anionic surfactant including alkyl alkoxylates, as claimed, because any anionic surfactant is expected to be functionally similar. It is to be noted that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982)*.

10. With respect to claims 7 and 8, Kovach discloses that the atomizing fluid is selected from water, steam, naphtha, hydrogen and other suitable gasiform diluent material or a combination of these materials (See column 3, lines 13-20, column 4, lines 36-44; column 10, lines 32-40, 56-59; column 14, lines 21-28).

11. With respect to claim 10, Kovach discloses effective amount of surfactant in a range of 0.01 to 2 wt% (100 ppm to 20,000 ppm) (See column 10, line 26) and having a mean droplet diameter less than 1000 μ (See column 10, lines 20-21). Since the range of amount of surfactant used by Kovach overlaps the claimed amount (per claim 2), and the mean droplet diameter through the feed nozzle is similar to the claimed invention, it is expected that the amount of surfactant used by Kovach is also capable of reducing the static and dynamic interfacial tension between the fluidized catalytic cracking (FCC) feed stream and the atomizing fluid, as claimed.

12. With respect to claim 11, Kovach discloses effective cracking conditions including (i) temperature from 900 to 1200°F (482 to 649°C) (See column 4, lines 58-60), (iii) catalyst to feed weight ratio of 11:1 (See column 18, lines 11-12).

Kovach invention does not appear to specifically disclose hydrocarbon partial pressure, however, the invention does disclose reduction in hydrocarbon partial pressure by addition of proper amount of atomizing fluid (See column 14, lines 21-28) and the total pressure in the cracking system in a range of 10 to 50 psia (See column 4, lines 58-62).

Thus, it would have been obvious to one skilled in the art at the time of invention to modify Kovach invention and specify the hydrocarbon partial pressure for proper control of the hydrocarbon cracking operation.

13. With respect to claims 12 and 16-18, Kovach discloses effective amount of surfactant in a range of 0.01 to 2 wt% (100 ppm to 20,000 ppm) (See column 10, line 26). Kovach also discloses recovering from the naphtha boiling range product and recycling of C_{2-} dry gas in the FCC product stream (See column 15, lines 12-19).

It is to be noted that Kovach is using the surfactant in a range similar to the claimed invention, therefore, it is expected that Kovach should also be achieving reduction in the amount of C_{2-} dry gas as claimed. It is also to be noted that Kovach is silent on foaming, haze and oxygenates content in the FCC product stream. This clearly indicates that Kovach invention should necessarily be achieving the FCC product

stream without causing foaming, haze, or increasing the oxygenate content of the naphtha boiling range product stream, similar to the Applicant's claim.

14. With respect to claim 13, Kovach discloses production of naphtha boiling range product by fractionating FCC product stream (See column 15, lines 12-16).

15. With respect to claim 15, Kovach discloses effective amount of surfactant in a range of 0.01 to 2 wt% (100 ppm to 20,000 ppm) (See column 10, line 26). Since Kovach is using a surfactant similar to the claimed surfactant and the range of amount of surfactant used by Kovach overlaps the claimed amount (per claim 2), it is expected that the amount of surfactant used by Kovach is also capable of reducing the static and dynamic interfacial tension between the fluidized catalytic cracking (FCC) feed stream and the atomizing fluid in a range as claimed.

16. With respect to claim 19, Kovach discloses a surfactant-enhanced fluid catalytic cracking process (See abstract) comprising:

(a) mixing an effective amount of a surfactant with an atomization fluid selected from water, steam, naphtha, hydrogen and other suitable gasiform diluent material and/or combinations thereof to form a first mixture (See column 10, lines 18-32; column 14, lines 17-28);

(b) injecting said first mixture into a fluidized catalytic cracking feed stream to form a second mixture (See column 14, lines 17-28);;

(c) conducting said second mixture through a feed nozzle into a fluidized catalytic cracking reaction zone, thereby producing droplets of the second mixture and injecting them into a reaction zone (See column 10, lines 15-55, column 14, lines 17-28).; and (d) contacting the droplets of the second mixture with a FCC catalyst under effective catalytic cracking conditions in the reaction zone thereby producing at least an FCC product stream comprising at least C_2- dry gas (See column 10, lines 15-55; column 14, lines 17-28, 59-68; column 15, lines 1-19).

Kovach further discloses stripping the spent catalyst to recover strippable hydrocarbons (See column 15, lines 26-37).

Kovach invention does not appear to specifically disclose that the effective amount of surfactant is that amount of surfactant capable of reducing the static and dynamic interracial tension between the fluidized catalytic cracking feed stream and the atomizing fluid.

Kovach discloses using a surfactant similar to the Applicant's claim (See column 3, lines 49-50; column 10, line 26) and an effective amount of surfactant in a range of 0.01 to 2 wt% (100 to 20,000 ppm) (See column 10, line 26) which overlaps the claimed range of amount of surfactant. Thus, it is expected that in Kovach invention also the surfactant is capable of reducing the static and dynamic interracial tension between the fluidized catalytic cracking feed stream and the atomizing fluid, as claimed.

17. With respect to claim 20, Kovach discloses use of surfactant in an amount of 0.01 to 2 wt% (100 to 20, 000 ppm) (See column 10, lines 22-27). Thus, the range of

amount of surfactant used by Kovach overlaps the claimed amount. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).*

18. With respect to claims 21-23, Kovach discloses using anionic surfactants (See column 10, lines 22-32). Thus, it is expected that the surfactants used by Kovach should not decompose under FCC feed preheating, but should decompose under cracking conditions, as claimed by the Applicant, because both are using anionic surfactants. It is also expected that the hydrophilic lipophilic balance values should be in a range as claimed because Kovach is using surfactants similar to the Applicant's claim.

Although Kovach invention does not appear to specifically disclose the specific surfactants, however, the invention does disclose use of anionic surfactants. Since the claimed surfactants belong to the class of anionic surfactants, it would have been obvious to one skilled in the art at the time of invention to use any anionic surfactant including as claimed, because any anionic surfactant is expected to be functionally similar. It is to be noted that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982).*

19. With respect to claim 24, Kovach discloses that the atomizing fluid is steam (See column 14, lines 21-28).

20. With respect to claim 25, Kovach discloses effective amount of surfactant in a range of 0.01 to 2 wt% (100 ppm to 20,000 ppm) (See column 10, line 26) and having a mean droplet diameter less than 1000 μ (See column 10, lines 20-21). Since the range of amount of surfactant used by Kovach overlaps the claimed range (per claim 2), and the mean droplet diameter through the feed nozzle is similar to the claimed invention, it is expected that the amount of surfactant used by Kovach is also capable of reducing the static and dynamic interfacial tension between the fluidized catalytic cracking (FCC) feed stream and the atomizing fluid, as claimed.

21. With respect to claim 26, Kovach discloses effective cracking conditions including (i) temperature from 900 to 1200°F (482 to 649°C) (See column 4, lines 58-60), (iii) catalyst to feed weight ratio of 11:1 (See column 18, lines 11-12).

Kovach invention does not appear to specifically disclose hydrocarbon partial pressure, however, the invention does disclose reduction in the partial pressure by addition of atomizing diluent (See column 14, lines 21-28) and the total pressure in the cracking system in a range of 10 to 50 psia (See column 4, lines 58-62).

Thus, it would have been obvious to one skilled in the art at the time of invention to modify Kovach invention and specify the hydrocarbon partial pressure for proper control of the hydrocarbon cracking operation.

22. With respect to claims 27, 30 and 31, Kovach discloses effective amount of surfactant in a range of 0.01 to 2 wt% (100 ppm to 20,000 ppm) (See column 10, line

26). Kovach also discloses recovering from the naphtha boiling range product and recycling of C_{2-} dry gas in the FCC product stream (See column 15, lines 12-19).

It is to be noted that Kovach is using a surfactant similar to the claimed surfactant and also, Kovach is using the surfactant in a range overlapping the claimed range. Thus, it is expected that Kovach should also be achieving reduction in the amount of C_{2-} dry gas as claimed. It is also to be noted that Kovach is silent on foaming, haze and oxygenates content in the FCC product stream. This clearly indicates that Kovach invention should necessarily be achieving the FCC product stream without causing foaming, haze, or increasing the oxygenate content of the naphtha boiling range product stream, similar to the Applicant's claim.

23. With respect to claim 28, Kovach discloses production of naphtha boiling range product by fractionating FCC product stream (See column 15, lines 12-16).

24. With respect to claim 29, Kovach discloses that the feed stream is selected from widely diverse materials as heavy bottoms from crude oil, heavy bitumen crude oil, those crude oils known as "heavy crude" which approximate the properties of reduced crude, shale oil, tar sand extract, products from coal liquefaction and solvated coal, atmospheric and vacuum reduced crude, aromatic extract from lube oil refining, tar bottoms, heavy cycle oil, slop oil, and refinery waste stream comprising mixtures of the foregoing. Such mixtures can for instance be prepared by mixing available hydrocarbon fractions, including oils, tars, pitches and the like (See column 5, lines 13-29). Kovach

also discloses using heavy hydrocarbons boiling at about 1050°F (See column 5, lines 60-68).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PREM C SINGH/
Examiner, Art Unit 1797